Complete Summary

GUIDELINE TITLE

Infectious Diseases Society of America/American Thoracic Society consensus guidelines on the management of community-acquired pneumonia in adults.

BIBLIOGRAPHIC SOURCE(S)

Mandell LA, Wunderink RG, Anzueto A, Bartlett JG, Campbell GD, Dean NC, Dowell SF, File TM Jr, Musher DM, Niederman MS, Torres A, Whitney CG. Infectious Diseases Society of America/American Thoracic Society consensus guidelines on the management of community-acquired pneumonia in adults. Clin Infect Dis 2007 Mar 1;44 Suppl 2:S27-72. [335 references] PubMed

GUIDELINE STATUS

This is the current release of the guideline.

** REGULATORY ALERT **

FDA WARNING/REGULATORY ALERT

Note from the National Guideline Clearinghouse (NGC): This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- July 08, 2008, Fluoroquinolones (ciprofloxacin, norfloxacin, ofloxacin, levofloxacin, moxifloxacin, gemifloxacin): A BOXED WARNING and Medication Guide are to be added to the prescribing information to strengthen existing warnings about the increased risk of developing tendinitis and tendon rupture in patients taking fluoroquinolones for systemic use.
- April 02, 2008, Relenza (zanamivir): GlaxoSmithKline informed healthcare professionals of changes to the warnings and precautions sections of prescribing information for Relenza. There have been reports (mostly from Japan) of delirium and abnormal behavior leading to injury in patients with influenza who are receiving neuraminidase inhibitors, including Relenza.
- March 4, 2008, Tamiflu (oseltamivir phosphate): Roche and the U.S. Food and Drug Administration (FDA) informed healthcare professionals of neuropsychiatric events associated with the use of Tamiflu, in patients with influenza. Roche has updated the PRECAUTIONS section of the package insert to include the new information and guidance under the Neuropsychiatric Events heading.
- September 11, 2007, Rocephin (ceftriaxone sodium): Roche informed healthcare professionals about revisions made to the prescribing information for Rocephin to clarify the potential risk associated with concomitant use of Rocephin with calcium or calcium-containing solutions or products.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Community-acquired pneumonia (CAP)

GUIDELINE CATEGORY

Diagnosis
Management
Treatment

CLINICAL SPECIALTY

Critical Care
Emergency Medicine
Family Practice
Infectious Diseases
Internal Medicine
Pulmonary Medicine

INTENDED USERS

Hospitals
Physicians

GUIDELINE OBJECTIVE(S)

To update clinicians with regard to important advances and controversies in the management of patients with community-acquired pneumonia

TARGET POPULATION

Adult patients with community-acquired pneumonia (CAP)

NOTE: The committee chose not to address CAP occurring in immunocompromised patients, including solid organ, bone marrow, or stem cell transplant recipients; patients receiving cancer chemotherapy or long-term (>30 days) high-dose corticosteroid treatment; and patients with congenital or acquired immunodeficiency or those infected with human immunodeficiency virus (HIV) who have CD4 cell counts <350 cells/mm^3, although many of these patients may be infected with the same microorganisms. Pneumonia in children ($\leq$18 years of age) is also not addressed.

INTERVENTIONS AND PRACTICES CONSIDERED

Evaluation

1. Severity of illness scores (CURB-65) or prognostic model (Pneumonia Severity Index) to determine point of care
2. Evaluation of signs, symptoms, and subjective factors

Diagnostic Studies

1. Chest radiography
2. Investigations for specific pathogens, as warranted, including
    - Blood cultures and Gram staining
    - Sputum cultures
    - Urinary antigen tests
    - Testing for H5N1

Treatment

1. Antibiotics (empirical or pathogen-specific therapy), including
    - Macrolides
    - Doxycycline
    - Fluoroquinolones
    - Beta-lactam (in conjunction with macrolide, doxycycline, fluoroquinolone, aminoglycoside)
    - Vancomycin
    - Linezolid
2. Other treatments, including antifungals, antimycobacterials, and antivirals, as indicated, including:
    - Oseltamivir or zanamivir for influenza A
    - Oseltamivir plus antibacterial agent for suspected H5N1
    - Drotrecogin alfa activated for septic shock
    - Noninvasive ventilation for hypoxemia or respiratory distress
    - Low-tidal-volume ventilation

Prevention

1. Influenza vaccine
2. Pneumococcal vaccine
3. Smoking cessation
4. Reporting of cases
5. Respiratory hygiene measures

MAJOR OUTCOMES CONSIDERED

Not stated

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

Not stated

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Quality of Evidence

Level I (high): Evidence from well-conducted, randomized controlled trials.

Level II (moderate): Evidence from well-designed, controlled trials without randomization (including cohort, patient series, and case-control studies). Level II studies also include any large case series in which systematic analysis of disease patterns and/or microbial etiology was conducted, as well as reports of data on new therapies that were not collected in a randomized fashion.

Level III (low): Evidence from case studies and expert opinion. In some instances, therapy recommendations come from antibiotic susceptibility data without clinical observations.

METHODS USED TO ANALYZE THE EVIDENCE

Review
Review of Published Meta-Analyses

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

The process of guideline development started with the selection of committee cochairs by the presidents of the Infectious Diseases Society of America (IDSA) and the American Thoracic Society (ATS), in consultation with other leaders in the respective societies. The committee cochairs selected the committee. The IDSA members were those involved in the development of previous IDSA community-acquired pneumonia (CAP) guidelines, whereas ATS members were chosen in consultation with the leadership of the Mycobacteria Tuberculosis and Pulmonary Infection Assembly, with input from the chairs of the Clinical Pulmonary and Critical Care assemblies. Committee members were chosen to represent differing expertise and viewpoints on the various topics. One acknowledged weakness of this document is the lack of representation by primary care, hospitalist, and emergency medicine physicians.

The cochairs generated a general outline of the topics that was circulated to committee members for input. A conference phone call was used to review topics and to discuss evidence grading and the general aims and expectations of the document. The topics were divided, and committee members were assigned by the cochairs and charged with presentation of their topic at an initial face-to-face meeting, as well as with development of a preliminary document dealing with their topic. Controversial topics were assigned to 2 committee members, 1 from each society.

An initial face-to-face meeting of a majority of committee members involved presentations of the most controversial topics. Prolonged discussions followed each presentation, with consensus regarding the major issues achieved before moving to the next topic.

A second face-to-face meeting was also held for discussion of the less controversial areas and further critique of the initial drafts. Once general agreement on the separate topics was obtained, the cochairs incorporated the separate documents into a single statement, with substantial editing for style and consistency. The document was then redistributed to committee members to review and update with new information from the literature up to June 2006. Recommended changes were reviewed by all committee members by e-mail and/or conference phone call and were incorporated into the final document by the cochairs.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Strength of Recommendation

The strength of each recommendation was graded as "strong," "moderate," or "weak." Each committee member independently graded each recommendation on the basis of not only the evidence but also expert interpretation and clinical applicability. The final grading of each recommendation was a composite of the individual committee members' grades. For the final document, a strong

recommendation required ≥6 (of 12) of the members to consider it to be strong and the majority of the others to grade it as moderate.

The implication of a strong recommendation is that most patients should receive that intervention. While the committee members feel strongly that 100% compliance with guidelines is not the desired goal, the rationale for variation from a strongly recommended guideline should be apparent from the medical record.

Conversely, moderate or weak recommendations suggest that, even if a majority would follow the recommended management, many practitioners may not.

COST ANALYSIS

A formal cost analysis was not performed and published cost analyses were not reviewed.

METHOD OF GUIDELINE VALIDATION

Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

This document was submitted to the societies for approval. Each society independently selected reviewers, and changes recommended by the reviewers were discussed by the committee and incorporated into the final document. The guideline was then submitted to the Infectious Diseases Society of America (IDSA) Governing Council and the American Thoracic Society (ATS) Board of Directors for final approval.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Definitions of the levels of evidence (I–III) and grades of recommendation (strong, moderate, weak) are provided at the end of the "Major Recommendations" field.

Implementation of Guideline Recommendations

1. Locally adapted guidelines should be implemented to improve process of care variables and relevant clinical outcomes. **(Strong recommendation; level I evidence)**

Documented Benefits

2. Community acquired pneumonia (CAP) guidelines should address a comprehensive set of elements in the process of care rather than a single element in isolation. **(Strong recommendation; level III evidence)**

3. Development of local CAP guidelines should be directed toward improvement in specific and clinically relevant outcomes. **(Moderate recommendation; level III evidence)**

   See Table 3 in the original guideline document for a list of clinically relevant outcome parameters in community acquired pneumonia.

Site-of-Care Decisions

Hospital Admission Decision

4. Severity-of-illness scores, such as the CURB-65 criteria (confusion, uremia, respiratory rate, low blood pressure, age 65 years or greater), or prognostic models, such as the Pneumonia Severity Index (PSI), can be used to identify patients with CAP who may be candidates for outpatient treatment. **(Strong recommendation; level I evidence)**
5. Objective criteria or scores should always be supplemented with physician determination of subjective factors, including the ability to safely and reliably take oral medication and the availability of outpatient support resources. **(Strong recommendation; level II evidence)**
6. For patients with CURB-65 scores $\geq$2, more-intensive treatment—that is, hospitalization or, where appropriate and available, intensive in-home health care services—is usually warranted. **(Moderate recommendation; level III evidence)**

Intensive Care Unit (ICU) Admission Decision

7. Direct admission to an ICU is required for patients with septic shock requiring vasopressors or with acute respiratory failure requiring intubation and mechanical ventilation. **(Strong recommendation; level II evidence)**
8. Direct admission to an ICU or high-level monitoring unit is recommended for patients with 3 of the minor criteria for severe CAP listed in the Table below. **(Moderate recommendation; level II evidence)**

Table. Criteria for Severe Community-acquired Pneumonia
Minor criteria[a] • Respiratory rate[b] $\geq$30 breaths/min • PaO_2/FiO_2 ratio[b] $\leq$250 • Multilobar infiltrates • Confusion/disorientation • Uremia (BUN level, $\geq$20 mg/dL) • Leukopenia[c] (WBC count, <4000 cells/mm^3) • Thrombocytopenia (platelet count, < 100,000 cells/mm^3) • Hypothermia (core temperature, <36 degrees C) • Hypotension requiring aggressive fluid resuscitation Major criteria • Invasive mechanical ventilation

Table. Criteria for Severe Community-acquired Pneumonia
• Septic shock with the need for vasopressors

NOTE. BUN, blood urea nitrogen; PaO_2/FiO_2, arterial oxygen pressure/fraction of inspired oxygen; WBC, white blood cell.
[a] Other criteria to consider include hypoglycemia (in nondiabetic patients), acute alcoholism/alcoholic withdrawal, hyponatremia, unexplained metabolic acidosis or elevated lactate level, cirrhosis, and asplenia.
[b] A need for noninvasive ventilation can substitute for a respiratory rate >30 breaths/min or a PaO_2/FiO_2 ratio <250.
[c] As a result of infection alone.

Diagnostic Testing

9. In addition to a constellation of suggestive clinical features, a demonstrable infiltrate by chest radiograph or other imaging technique, with or without supporting microbiological data, is required for the diagnosis of pneumonia. **(Moderate recommendation: level III evidence)**

Recommended Diagnostic Tests for Etiology

10. Patients with CAP should be investigated for specific pathogens that would significantly alter standard (empirical) management decisions, when the presence of such pathogens is suspected on the basis of clinical and epidemiologic clues. **(Strong recommendation; level II evidence)**
11. Routine diagnostic tests to identify an etiologic diagnosis are optional for outpatients with CAP. **(Moderate recommendation; level III evidence)**
12. Pretreatment blood samples for culture and an expectorated sputum sample for stain and culture (in patients with a productive cough) should be obtained from hospitalized patients with the clinical indications listed in the Table below, but are optional for patients without these conditions. **(Moderate recommendation; level I evidence)**
13. Pretreatment Gram stain and culture of expectorated sputum should be performed only if a good-quality specimen can be obtained and quality performance measures for collection, transport, and processing of samples can be met. **(Moderate recommendation; level II evidence)**
14. Patients with severe CAP, as defined in the guideline should at least have blood samples drawn for culture, urinary antigen tests for *Legionella pneumophila* and *Streptococcus pneumoniae* performed, and expectorated sputum samples collected for culture. For intubated patients, an endotracheal aspirate sample should be obtained. **(Moderate recommendation; level II evidence)**

Table. Clinical Indications for More Extensive Diagnostic Testing					
Indication	**Blood Culture**	**Sputum Culture**	***Legionella* UAT**	**Pneumococcal UAT**	**Other**
Intensive care unit admission	X	X	X	X	X[a]
Failure of outpatient antibiotic therapy		X	X	X	
Cavitary infiltrates	X	X			X[b]

Table. Clinical Indications for More Extensive Diagnostic Testing					
Indication	**Blood Culture**	**Sputum Culture**	***Legionella* UAT**	**Pneumococcal UAT**	**Other**
Leukopenia	X			X	
Active alcohol abuse	X	X	X	X	
Chronic severe liver disease	X			X	
Severe obstructive/ structural lung disease		X			
Asplenia (anatomic or functional)	X			X	
Recent travel (within past 2 weeks)			X		X[c]
Positive *Legionella* UAT result		X[d]	NA		
Positive pneumococcal UAT result	X	X		NA	
Pleural effusion	X	X	X	X	X[e]

NOTE. NA, not applicable; UAT, urinary antigen test.
[a] Endotracheal aspirate if intubated, possibly bronchoscopy or nonbronchoscopic bronchoalveolar lavage.
[b] Fungal and tuberculosis cultures.
[c] See table 8 in the original guideline document for details.
[d] Special media for *Legionella*.
[e] Thoracentesis and pleural fluid cultures.

Antibiotic Treatment

A major goal of therapy is eradication of the infecting organism, with resultant resolution of clinical disease. As such, antimicrobials are a mainstay of treatment. Appropriate drug selection is dependent on the causative pathogen and its antibiotic susceptibility.

Recommendations are generally for a class of antibiotics rather than a specific drug, unless outcome data clearly favor one drug. Because overall efficacy remains good for many classes of agents, the more potent drugs are given preference because of their benefit in decreasing the risk of selection for antibiotic resistance. Other factors for consideration of specific antimicrobials include pharmacokinetics/pharmacodynamics, compliance, safety, and cost.

Empirical Antimicrobial Therapy

Outpatient Treatment

The following regimens are recommended for outpatient treatment on the basis of the listed clinical risks.

15. Previously healthy and no risk factors for drug-resistant *Streptococcus pneumoniae* (DRSP) infection:

A. A macrolide (azithromycin, clarithromycin, or erythromycin) **(Strong recommendation; level I evidence)**
B. Doxycycline **(Weak recommendation; level III evidence)**

16. Presence of comorbidities, such as chronic heart, lung, liver, or renal disease; diabetes mellitus; alcoholism; malignancies; asplenia; immunosuppressing conditions or use of immunosuppressing drugs; use of antimicrobials within the previous 3 months (in which case an alternative from a different class should be selected); or other risks for DRSP infection:
    A. A respiratory fluoroquinolone (moxifloxacin, gemifloxacin, or levofloxacin [750 mg]) **(Strong recommendation; level I evidence)**
    B. A beta-lactam **plus** a macrolide **(Strong recommendation; level I evidence)** (High-dose amoxicillin [e.g., 1 g 3 times daily] or amoxicillin-clavulanate [2 g 2 times daily] is preferred; alternatives include ceftriaxone, cefpodoxime, and cefuroxime [500 mg 2 times daily]; doxycycline **(level II evidence)** is an alternative to the macrolide.)

17. In regions with a high rate (>25%) of infection with high-level (minimal inhibitory concentration [MIC], $\geq$16 micrograms/mL) macrolide-resistant *S. pneumoniae*, consider the use of alternative agents listed above in recommendation 16 for any patient, including those without comorbidities. **(Moderate recommendation; level III evidence)**

Inpatient, Non-ICU Treatment

The following regimens are recommended for hospital ward treatment.

18. A respiratory fluoroquinolone **(Strong recommendation; level I evidence)**
19. A beta-lactam **plus** a macrolide **(Strong recommendation; level I evidence)** (Preferred beta-lactam agents include cefotaxime, ceftriaxone, and ampicillin; ertapenem for selected patients; with doxycycline **(level III evidence)** as an alternative to the macrolide. A respiratory fluoroquinolone should be used for penicillin-allergic patients.)

Inpatient, ICU Treatment

The following regimen is the minimal recommended treatment for patients admitted to the ICU.

20. A beta-lactam (cefotaxime, ceftriaxone, or ampicillin-sulbactam) **plus** either azithromycin **(level II evidence)** or a fluoroquinolone **(Strong recommendation; level I evidence)** (For penicillin-allergic patients, a respiratory fluoroquinolone and aztreonam are recommended.)
21. For *Pseudomonas* infection, use an antipneumococcal, antipseudomonal beta-lactam (piperacillin-tazobactam, cefepime, imipenem, or meropenem) plus either ciprofloxacin or levofloxacin (750-mg dose)

    or

the above beta-lactam plus an aminoglycoside and azithromycin

or

the above beta-lactam plus an aminoglycoside and an antipneumococcal fluoroquinolone (for penicillin-allergic patients, substitute aztreonam for the above beta-lactam). **(Moderate recommendation; level III evidence)**

22. For community-acquired methicillin-resistant *Staphylococcus aureus* (CA-MRSA) infection, add vancomycin or linezolid. **(Moderate recommendation; level III evidence)**

Pathogens Suspected on the Basis of Epidemiologic Considerations

Clinicians should be aware of epidemiologic conditions and/ or risk factors that may suggest that alternative or specific additional antibiotics should be considered. These conditions and specific pathogens, with preferred treatment, are listed in tables 8 and 9 in the original guideline document.

Pathogen-directed Therapy

23. Once the etiology of CAP has been identified on the basis of reliable microbiological methods, antimicrobial therapy should be directed at that pathogen **(Moderate recommendation; level III evidence)**
24. Early treatment (within 48 h of the onset of symptoms) with oseltamivir or zanamivir is recommended for influenza A. **(Strong recommendation; level I evidence)**
25. Use of oseltamivir and zanamivir is not recommended for patients with uncomplicated influenza with symptoms for >48 h **(level I evidence)**, but these drugs may be used to reduce viral shedding in hospitalized patients or for influenza pneumonia. **(Moderate recommendation; level III evidence)**

Pandemic Influenza

26. Patients with an illness compatible with influenza and with known exposure to poultry in areas with previous H5N1 infection should be tested for H5N1 infection. **(Moderate recommendation; level III evidence)**
27. In patients with suspected H5N1 infection, droplet precautions and careful routine infection control measures should be used until an H5N1 infection is ruled out. **(Moderate recommendation; level III evidence)**
28. Patients with suspected H5N1 infection should be treated with oseltamivir **(level II evidence)** and antibacterial agents targeting *S. pneumoniae* and *S. aureus*, the most common causes of secondary bacterial pneumonia in patients with influenza. **(Moderate recommendation; level III evidence)**

Time to First Antibiotic Dose

29. For patients admitted through the emergency department (ED), the first antibiotic dose should be administered while still in the ED. **(Moderate recommendation; level III evidence)**

Switch from Intravenous to Oral Therapy

30. Patients should be switched from intravenous to oral therapy when they are hemodynamically stable and improving clinically, are able to ingest medications, and have a normally functioning gastrointestinal tract. **(Strong recommendation; level II evidence)**
31. Patients should be discharged as soon as they are clinically stable, have no other active medical problems, and have a safe environment for continued care. Inpatient observation while receiving oral therapy is not necessary. **(Moderate recommendation; level II evidence)**

Duration of Antibiotic Therapy

32. Patients with CAP should be treated for a minimum of 5 days **(level I evidence)**, should be afebrile for 48 to 72 h, and should have no more than 1 CAP-associated sign of clinical instability (see Table below) before discontinuation of therapy. **(level II evidence) (Moderate recommendation)**
33. A longer duration of therapy may be needed if initial therapy was not active against the identified pathogen or if it was complicated by extrapulmonary infection, such as meningitis or endocarditis. **(Weak recommendation; level III evidence)**

Table. Criteria for Clinical Stability
• Temperature $\leq$37.8 degrees C • Heart rate $\leq$100 beats/min • Respiratory rate $\leq$24 breaths/min • Systolic blood pressure $\geq$90 mm Hg • Arterial oxygen saturation $\geq$90% or pO_2 $\geq$60 mm Hg on room air • Ability to maintain oral intake* • Normal mental status*

NOTE: Criteria are from (Ramirez et al., 1995; Halm et al., 1998; Menendez et al., 2004). pO_2, oxygen partial pressure.
*Important for discharge or oral switch decision but not necessarily for determination of nonresponse.

Other Treatment Considerations

34. Patients with CAP who have persistent septic shock despite adequate fluid resuscitation should be considered for treatment with drotrecogin alfa activated within 24 h of admission. **(Weak recommendation; level II evidence)**
35. Hypotensive, fluid-resuscitated patients with severe CAP should be screened for occult adrenal insufficiency. **(Moderate recommendation; level II evidence)**
36. Patients with hypoxemia or respiratory distress should receive a cautious trial of noninvasive ventilation (NIV) unless they require immediate intubation because of severe hypoxemia (arterial oxygen pressure/fraction of inspired oxygen [PaO_2/FiO_2] ratio <150) and bilateral alveolar infiltrates. **(Moderate recommendation; level I evidence)**

37. Low-tidal-volume ventilation (6 cm^3/kg of ideal body weight) should be used for patients undergoing ventilation who have diffuse bilateral pneumonia or acute respiratory distress syndrome. **(Strong recommendation; level I evidence)**

Management of Nonresponding Pneumonia

Because of the limitations of diagnostic testing, the majority of CAP is still treated empirically. Critical to empirical therapy is an understanding of the management of patients who do not follow the normal response pattern.

Definitions and Classification

The term "nonresponding pneumonia" is used to define a situation in which an inadequate clinical response is present despite antibiotic treatment.

38. The use of a systematic classification of possible causes of failure to respond, based on time of onset and type of failure (See Table below) is recommended. **(Moderate recommendation; level II evidence)**

Table. Patterns and Etiologies of Types of Failure to Respond

Failure to improve

Early (<72 h of treatment)

- Normal response

Delayed

- Resistant microorganism
  - Uncovered pathogen
  - Inappropriate by sensitivity
- Parapneumonic effusion/empyema
- Nosocomial superinfection
  - Nosocomial pneumonia
  - Extrapulmonary
- Noninfectious
  - Complication of pneumonia (e.g., BOOP)
  - Misdiagnosis: PE, CHF, vasculitis
  - Drug fever

Deterioration or progression

Early (<72 h of treatment)

- Severity of illness at presentation
- Resistant microorganism
  - Uncovered pathogen
  - Inappropriate by sensitivity
- Metastatic infection

Table. Patterns and Etiologies of Types of Failure to Respond
• Empyema/parapneumonic • Endocarditis, meningitis, arthritis • Inaccurate diagnosis • PE, aspiration, ARDS • Vasculitis (e.g., SLE) Delayed • Nosocomial superinfection • Nosocomial pneumonia • Extrapulmonary • Exacerbation of comorbid illness • Intercurrent noninfectious disease • PE • Myocardial infarction • Renal failure

NOTE. ARDS, acute respiratory distress syndrome; BOOP, bronchiolitis obliterans organizing pneumonia; CHF, congestive heart failure; PE, pulmonary embolus; SLE, systemic lupus erythematosis.

Prevention

39. All persons ≥50 years of age, others at risk for influenza complications, household contacts of high-risk persons, and health care workers should receive inactivated influenza vaccine as recommended by the Advisory Committee on Immunization Practices, Centers for Disease Control and Prevention. **(Strong recommendation; level I evidence)**
40. The intranasally administered live attenuated vaccine is an alternative vaccine formulation for some persons 5 to 49 years of age without chronic underlying diseases, including immunodeficiency, asthma, or chronic medical conditions. **(Strong recommendation; level I evidence)**
41. Health care workers in inpatient and outpatient settings and long-term care facilities should receive annual influenza immunization. **(Strong recommendation; level I evidence)**
42. Pneumococcal polysaccharide vaccine is recommended for persons ≥65 years of age and for those with selected high-risk concurrent diseases, according to current Advisory Committee on Immunization Practices guidelines. **(Strong recommendation; level II evidence)**
43. Vaccination status should be assessed at the time of hospital admission for all patients, especially those with medical illnesses. **(Moderate recommendation; level III evidence)**
44. Vaccination may be performed either at hospital discharge or during outpatient treatment. **(Moderate recommendation; level III evidence)**
45. Influenza vaccine should be offered to persons at hospital discharge or during outpatient treatment during the fall and winter. **(Strong recommendation; level III evidence)**
46. Smoking cessation should be a goal for persons hospitalized with CAP who smoke. **(Moderate recommendation; level III evidence)**

47. Smokers who will not quit should also be vaccinated for both pneumococcus and influenza. **(Weak recommendation; level III evidence)**
48. Cases of pneumonia that are of public health concern should be reported immediately to the state or local health department. **(Strong recommendation; level III evidence)**
49. Respiratory hygiene measures, including the use of hand hygiene and masks or tissues for patients with cough, should be used in outpatient settings and EDs as a means to reduce the spread of respiratory infections. **(Strong recommendation; level III evidence)**

Definitions:

Strength of Recommendation

The strength of each recommendation was graded as "strong," "moderate," or "weak." Each committee member independently graded each recommendation on the basis of not only the evidence but also expert interpretation and clinical applicability. The final grading of each recommendation was a composite of the individual committee members' grades. For the final document, a strong recommendation required $\geq$6 (of 12) of the members to consider it to be strong and the majority of the others to grade it as moderate.

The implication of a strong recommendation is that most patients should receive that intervention. While the committee members feel strongly that 100% compliance with guidelines is not the desired goal, the rationale for variation from a strongly recommended guideline should be apparent from the medical record.

Conversely, moderate or weak recommendations suggest that, even if a majority would follow the recommended management, many practitioners may not.

Quality of Evidence

Level I (high): Evidence from well-conducted, randomized controlled trials.

Level II (moderate): Evidence from well-designed, controlled trials without randomization (including cohort, patient series, and case-control studies). Level II studies also include any large case series in which systematic analysis of disease patterns and/or microbial etiology was conducted, as well as reports of data on new therapies that were not collected in a randomized fashion.

Level III (low): Evidence from case studies and expert opinion. In some instances, therapy recommendations come from antibiotic susceptibility data without clinical observations.

CLINICAL ALGORITHM(S)

None provided

EVIDENCE SUPPORTING THE RECOMMENDATIONS

REFERENCES SUPPORTING THE RECOMMENDATIONS

References open in a new window

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The type of supporting evidence is identified and graded for each recommendation (see "Major Recommendations").

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

- Accurate diagnosis and appropriate treatment of community acquired pneumonia
- Appropriate utilization of empiric antibiotic therapy for community acquired pneumonia
- Appropriate utilization of antibiotics and clinical resources
- Decreased length of stay, costs, and antibiotic overuse

POTENTIAL HARMS

Treatment without a diagnosis of community-acquired pneumonia (CAP) can result in the inappropriate use of antibiotics with a concomitant increase in costs, adverse drug events, increased antibiotic selection pressure, and, possibly, increased antibiotic resistance.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- It is important to realize that guidelines cannot always account for individual variation among patients. They are not intended to supplant physician judgment with respect to particular patients or special clinical situations. The Infectious Diseases Society of America (IDSA) considers adherence to these guidelines to be voluntary, with the ultimate determination regarding their application to be made by the physician in the light of each patient's individual circumstances.
- The guidelines are intended primarily for use by emergency medicine physicians, hospitalists, and primary care practitioners; however, the extensive literature evaluation suggests that they are also an appropriate starting point for consultation by specialists. Substantial overlap exists among the patients whom these guidelines address and those discussed in the recently published guidelines for health care–associated pneumonia (HCAP). Pneumonia in nonambulatory residents of nursing homes and other long-term care facilities epidemiologically mirrors hospital-acquired pneumonia and should be treated according to the HCAP guidelines. However, certain other patients whose conditions are included in the designation of HCAP are better

served by management in accordance with community-acquired pneumonia (CAP) guidelines with concern for specific pathogens.
- Although much of the literature cited originates in Europe, these guidelines are oriented toward the United States and Canada. Although the guidelines may be applicable to other parts of the world, local antibiotic resistance patterns, drug availability, and variations in health care systems suggest that modification of these guidelines is prudent for local use.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

See the original guideline document for information about implementation of guideline recommendations.

Suggested Performance Indicators

Performance indicators are tools to help guideline users measure both the extent and the effects of implementation of guidelines. Such tools or measures can be indicators of the process itself, outcomes, or both. Deviations from the recommendations are expected in a proportion of cases, and compliance in 80 to 95% of cases is generally appropriate, depending on the indicator.

Four specific performance indicators have been selected for the community-acquired pneumonia (CAP) guidelines, 3 of which focus on treatment issues and 1 of which deals with prevention:

- Initial empirical treatment of CAP should be consistent with guideline recommendations. Data exist that support the role of CAP guidelines and that have demonstrated reductions in cost, length of hospital stay (LOS), and mortality when the guidelines are followed. Reasons for deviation from the guidelines should be clearly documented in the medical record.
- The first treatment dose for patients who are to be admitted to the hospital should be given in the emergency department (ED). Unlike in prior guidelines, a specific time frame is not being recommended. Initiation of treatment would be expected within 6–8 h of presentation whenever the admission diagnosis is likely CAP. A rush to treatment without a diagnosis of CAP can, however, result in the inappropriate use of antibiotics with a concomitant increase in costs, adverse drug events, increased antibiotic selection pressure, and, possibly, increased antibiotic resistance. Consideration should be given to monitoring the number of patients who receive empirical antibiotics in the ED but are admitted to the hospital without an infectious diagnosis.
- Mortality data for all patients with CAP admitted to wards, intensive care units (ICUs), or high-level monitoring units should be collected. Although tools to predict mortality and severity of illness exist—such as the Pneumonia Severity Index (PSI) and CURB-65 criteria, respectively—none is foolproof. Overall mortality rates for all patients with CAP admitted to the hospital, including general medical wards, should be monitored and compared with severity-adjusted norms. In addition, careful attention should be paid to the percentage of patients with severe CAP, as defined in this document, who are

admitted initially to a non-ICU or a high-level monitoring unit and to their mortality rate.
- It is important to determine what percentage of at-risk patients in one's practice actually receive immunization for influenza or pneumococcal infection. Prevention of infection is clearly more desirable than having to treat established infection, but it is clear that target groups are undervaccinated.

IMPLEMENTATION TOOLS

Audit Criteria/Indicators
Personal Digital Assistant (PDA) Downloads

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Getting Better
Staying Healthy

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

Mandell LA, Wunderink RG, Anzueto A, Bartlett JG, Campbell GD, Dean NC, Dowell SF, File TM Jr, Musher DM, Niederman MS, Torres A, Whitney CG. Infectious Diseases Society of America/American Thoracic Society consensus guidelines on the management of community-acquired pneumonia in adults. Clin Infect Dis 2007 Mar 1;44 Suppl 2:S27-72. [335 references] PubMed

ADAPTATION

Not applicable: The guideline was not adapted from another source.

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GUIDELINE DEVELOPER(S)

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GUIDELINE COMMITTEE

Infectious Diseases Society of America (IDSA) Standards and Practice Guidelines Committee

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

L.A.M. has received research funding from Bayer, Chiron, Ortho-McNeil, Oscient, and Pfizer; has served as a consultant to Bayer, Cempra, Novexel, Ortho-McNeil, Oscient, Pfizer, Sanofi-Aventis, Targanta, and Wyeth; and has served on speakers' bureaus for Bayer, Ortho-McNeil, Oscient, Pfizer, and Sanofi-Aventis. R.G.W. has received research funding from Chiron, Eli Lilly, Pfizer, and Wyeth; has served on the Clinical Evaluation Committee for Johnson and Johnson; has served as a clinical trial participant in studies initiated by Takeda, Biosite, Inverness Medical Intervention, Johnson and Johnson, and Altana; and has served as consultant to the Oklahoma Foundation for Medical Quality and the Centers for Medicare and Medicaid Services. J.G.B. serves on the advisory board of Johnson and Johnson. T.M.F. has received research funding from Binax Incorporated, Ortho-McNeil, Oscient, Pfizer, and Sanofi-Aventis; has served as a consultant to Bayer, GlaxoSmithKline, Merck, Ortho-McNeil, Oscient, Pfizer, Sanofi-Aventis, Schering-Plough, and Wyeth; and has served on speakers' bureaus for Abbott, GlaxoSmithKline, Merck, Ortho-McNeil, Oscient, Pfizer, Sanofi-Aventis, Schering-Plough, and Wyeth. N.A.D has received research support from Altana and Sanofi-Aventis; has served on the advisory boards for Sanofi-Aventis and AstraZeneca; and has served on the speakers' bureaus for Pfizer, Schering-Plough, Sanofi-

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GUIDELINE STATUS

This is the current release of the guideline.

GUIDELINE AVAILABILITY

Electronic copies: Available from the Infectious Diseases Society (IDSA) Web site.

Print copies: Available from Infectious Diseases Society of America, 66 Canal Center Plaza, Suite 600, Alexandria, VA 22314.

AVAILABILITY OF COMPANION DOCUMENTS

The following is available:

- Kish MA. Guide to development of practice guidelines. Clin Infect Dis 2001 Mar 15;32(6):851-4.

Electronic copies: Available from the Clinical Infectious Diseases Journal Web site.

Print copies: Available from Infectious Diseases Society of America, 1300 Wilson Boulevard, Suite 300, Arlington, VA 22209.

Additionally, suggested performance indicators are provided in the original guideline document.

A PDA version of the original guideline document is available from www.idsaguidelinesforhandhelds.org.

PATIENT RESOURCES

None available

NGC STATUS

This summary was completed by ECRI on April 3, 2007. The information was verified by the guideline developer on May 8, 2007. This summary was updated by ECRI Institute on October 3, 2007 following the U.S. Food and Drug Administration (FDA) advisory on Rocephin (ceftriaxone sodium). This summary was updated by ECRI Institute on March 10, 2008 following the U.S. Food and

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